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THE JOURNAL OF DENTAL EDUCATION

A QUARTERLY FOR THE DENTAL TEACHER

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America's schools face one of their biggest tasks in recreating interest in the pleasure of work. In the middle of the 20th century, we are dedicated to the four freedoms of our "good life"—freedom from toil, freedom from responsibilities, freedom to take it easy, and freedom to do nothing.

WILLIAM S. CARLSON,
President, University of Vermont.

EDITORIALS

Dental Roentgenology in Medical Diagnosis

Dental roentgenology has been employed as an adjunct in medical diagnosis for the last four decades, mainly in search for focal infection of dental origin. During the last two decades a great deal of additional knowledge has been gained about metabolic disturbances and their effect upon mineral metabolism, and it has been recognized that manifestations of these disturbances may appear in the teeth and their supporting osseous structures, as well as elsewhere in the skeleton. It has been found that the dental roentgenogram is of special value in the recognition of early and minimal distortion of trabecular pattern, and demineralization of bone; it is becoming more widely employed as one of the measures to determine whether skeletal features of these disturbances are present. While the greatest interest in dental roentgenology appears to have been in metabolic disturbances, particularly those of endocrine origin, there are numerous other conditions such as Paget's disease, acrosclerosis, skeletal and ectodermal developmental disturbances, and inflammatory diseases of bone, in which the dental roentgenogram is often an invaluable aid in diagnosis.

The responsibility for the development and application of dental roentgenology in the field of medical diagnosis must be shouldered in the main by the dentist. The general roentgenologist's field of endeavor is so diversified that it would only be in rarest instances that he would be interested in developing this more limited field to the fullest extent of its possibilities.

Probably the first and most important step is to provide the dental undergraduate with at least a basic knowledge of the subject, for it must be realized that it is often the general practitioner who has the first opportunity to observe and detect, from the dental roentgenogram, changes which provide an early clue to a systemic disease that may be present. This obviously emphasizes the need for teachers of dental roentgenology who have acquainted themselves with the knowledge which is available at present, and who are thereby qualified to teach the subject. The responsibility for future development and for provision of additional knowledge is largely up to those who have an opportunity to observe and study, first hand, material which is available in hospitals and medical centers, and to those who are associated with institutions which have research facilities available.

One might look upon this as an additional field in which the dentist

can make practical application of the training he has received. To make such application would, in a large measure, justify the time which the present dental graduate has been obliged to devote to the study of anatomy, pathology, physiology and the other basic sciences.

EDWARD C. STAFNE, D.D.S.

Scholarships

Scholarships are currently announced in different fields and under different auspices as follows:

(1) *Research and Allied Fields*, through the Public Health Service, Federal Security Agency, Washington, D. C. (Address Research Fellowship Branch, Division of Research Grants and Fellowships, National Institute of Health, Bethesda 14, Md.)

(2) *Research Assistantships in Chemistry*, through the American Dental Association and the American College of Dentists. (Address American Dental Association, Bureau of Chemistry, 212 East Superior Street, Chicago 11, Ill.)

National Board of Dental Examiners

At the request of the Secretary of the Council of Dental Education, announcement is made of a meeting of the National Board of Dental Examiners for the purpose of examining candidates on Monday and Tuesday, December 4 and 5, 1950.

Parts I and II of the examinations will be given. Students may receive application blanks from their Deans, making application directly to the Office of the Secretary of the Council, 222 East Superior Street, Chicago 11, Illinois.

The place of holding the examination will be given to applicant at the time he files his application. The fee is $15.00.

The Journal of Dental Education to Be Microfilmed

The American Association of Dental Schools has entered into an agreement with University Microfilms, Ann Arbor, Michigan, to make issues of THE JOURNAL OF DENTAL EDUCATION available to libraries in microfilm form.

Through such an arrangement, libraries may keep the printed issues unbound and circulate them in that form during their period of greatest

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Microfilm sales are restricted to those subscribing to the paper editions and will be distributed only at the end of each volume year.

Inquiries should be directed to University Microfilms, 313 N. First Street, Ann Arbor, Michigan.

Oral Diagnosis

Reference was made recently, editorially, to a project sponsored by the Oral Diagnosis Section of the American Association of Dental Schools, and looking toward a long-term correlated program of investigation into that area which might, relatively speaking, be termed a "terra incognita"—the highly significant field of oral-systemic interrelationships. All of the dental schools in the United States and Canada and a number of overseas schools in Europe, Asia and Africa have been approached to find out how much practical interest there will be, on the part of our professional schools, in the furtherance of this program. It would seem very significant that the response, in nearly all instances, has been one of enthusiastic endorsement of this corporate attack on one of dentistry's greatest problems. Many institutions approved the plan as timely, if not long overdue; and a considerable number have already indicated the type of studies now in progress or to be initiated which will fall within the scope of the program.

The central committee will function in an informal and correlating capacity, dictating no arbitrary patterns of investigation but offering suggestions as to types of study when such counsel is desired; through correspondence, bulletins and the pages of the JOURNAL OF DENTAL EDUCATION making each group aware of others working in identical or related fields; acting as a liaison group wherever its functions may be of value, helping, for example, in the formulation of common approaches in the accumulation of survey material and in the statistical interpretation of results so that samples of optimal size and significance can be obtained. Each institution is, of course, free to publish material as desired; but, in addition, it is planned that a common report, sponsored by the Oral Diagnosis Section of the American Association of Dental Schools, will be compiled for the practical use of teachers, students and practitioners.[1]

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[1]Inquiries or suggestions may be addressed to Dr. R. Gordon Agnew, College of Dentistry, University of California, Third and Parnassus Avenues, San Francisco 22, Chairman of the Committee on Oral-Systemic Interrelationships.

THE EFFECTS OF THE STUDY OF HIGH SCHOOL CHEMISTRY UPON ORAL HYGIENE GRADES

JEAN E. NEWLIN,[1] R.D.H., M.S., *Philadelphia*

It has often been assumed that high school chemistry will have a favorable effect upon the performance of students in oral hygiene courses, particularly those involving chemistry. The courses in oral hygiene draw from chemistry, and therefore there has been discussion concerning the advisability of recommending that girls planning to enter the profession of oral hygiene elect chemistry in their high school program. This study was undertaken to see what differences in oral hygiene grades existed when one group had had chemistry in high school and the other had not.

The 2 groups studied were selected from the oral hygiene classes of the past 4 years (1946-1949) at the University of Pennsylvania. One group, consisting of 132 oral hygiene students who had taken high school chemistry, was compared with a group of 39 oral hyigene students who had not taken high school chemistry. In order to reduce age range and possible advantage due to improvement of study habits from additional practice, only students who had no formal education beyond the secondary level were included. The writer taught the oral hygiene course in chemistry during each of the 4 years of the study. There appeared to be little difference in the performance of the classes from year to year, and it seemed reasonable to assume that the students during each of the 4 years came from the same or similar population(s). The 4 classes, consequently, were combined in the study.

Table I shows the distributions of the percentage grades for both the oral hygiene chemistry and the oral hygiene averages for each group.

The means and the standard deviations for the oral hygiene chemistry grades and oral hygiene course averages are shown in Table II. The difference between the chemistry grade means, favoring the group which had high school chemistry, divided by its standard error, gave a critical ratio of 1.34, significant at about the 18% level. The slight difference between the means for the course averages, although favoring the group which had not had high school chemistry, was of even less significance.

These data indicate a lack of statistically significant difference between the means for the two groups in oral hygiene chemistry. Even though there appears to be a slight advantage in the chemistry grade mean for those students with high school chemistry, the C.R. of 1.34

[1]Instructor, Dental Hygiene, School of Dentistry, University of Pennsylvania.

with p=0.18 is not sufficient to support the hypothesis that there is a true difference in the chemistry course grades between those having and not having high school chemistry. It is interesting to note that there was no significant correlation of either high school chemistry grades with oral hygiene chemistry grades or high school chemistry grades with oral hygiene averages.

As a matter for speculation, it would be interesting to consider some of the possible reasons why the high school chemistry group did not

TABLE I

Percentage Grades in Oral Hygiene of Students With and Without High School Chemistry

% Grades	With High School Chemistry		Without High School Chemistry	
	Oral Hygiene Chemistry Grades	Oral Hygiene Course Averages*	Oral Hygiene Chemistry Grades	Oral Hygiene Course Averages
96-99	15	0	5	3
92-95	17	10	5	4
88-91	21	24	4	6
84-87	27	42	3	8
80-83	15	29	4	9
76-79	11	19	6	7
72-75	14	8	5	2
68-71	5	0	2	0
64-67	1	0	3	0
60-63	6	0	2	0
	N132	N132	N39	N39

*Oral Hygiene averages are defined as the averages for all courses in the hygiene curriculum.

TABLE II

Means and Standard Deviations of Groups With and Without High School Chemistry

	No. Cases	Oral Hygiene Chemistry Grades			Oral Hygiene Course Averages		
		Mean	S.D.	∽ Mean	Mean	S.D.	∽ Mean
Students With High School Chemistry	132	84.3	9.33	0.82	84.1	5.21	0.46
Students Without High School Chemistry	39	81.7	10.83	1.76	84.9	6.50	1.05
Difference		2.6	....	....	0.8	....	....
∽ Diff.		....	....	1.94	....	....	1.15

achieve superior grades. The oral hygiene chemistry course is a specialized chemistry course. It consists of those aspects of general chemistry which are applicable to oral hyigene. Some of the course content is not usually covered in elementary chemistry. For these reasons an understanding of a large part of the material is not dependent upon broad knowledge of inorganic chemistry but rather a few specifically applied principles of inorganic and organic chemistry. These principles when understood enable the student without high school chemistry to make progress comparable with the student with high school chemistry.

A part of the lack of difference in the grades of the 2 groups might be due to motivation of those students who have not had chemistry before. It may be that those students, on the whole, are acutely aware of their lack and enter the course with more mind set toward doing a greater amount of study. There also seems to be a tendency in the opposite direction on the part of some of those students who had had previous chemistry. It seems likely that such attitudes may affect the initial effort of the students, with advantage to those without chemistry experience.

It is sometimes argued that the course in chemistry in high school has no great effect in itself upon the influence of later chemistry grades but that it acts as a selective factor worth considering. Chemistry is included in the college preparatory curriculum. It might be expected that the brighter students would elect this curriculum; therefore one might possibly expect that selection of students from this group would, on the whole, enable the oral hygiene school to select better students. This line of reasoning is not supported by the data in Table I. There we find that 10 students (7.6%) of the group with high school chemistry earned 92-99 in oral hygiene course averages. In the other groups, 7 students (18%) of the group earned an average of 92-99 in all courses. The advantage for the highest scholastic average seems to be in favor of the group without secondary chemistry, although, of course, the difference is not statistically reliable.

In summary, this study was undertaken with the purpose of determining what, if any, advantage could be shown in favor of the performance of oral hygiene students who had taken high school chemistry. The study shows: (a) there is no statistically significant difference in mean achievement for the 2 groups in oral hygiene chemistry; (b) the 2 groups are nearly identical in mean achievement in oral hygiene averages. The study fails to support the rather common belief that high school chemistry is a desirable prerequisite for the oral hygiene program.

CONFERENCE SESSIONS

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Henry M. Wilbur, D.D.S., University of Louisville, *Presiding*

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(This subject, which was the basis for a panel discussion, constituted the program of this Section. A group of five persons participated in the discussion, three of whom presented papers submitted herewith. Ed.)

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5. OBJECTIVES IN PRE-CLINICAL TEACHING OF CROWN AND BRIDGE PROSTHESIS

A. *Presentation of the Subject*

ERNEST B. NUTTALL, D.D.S.,[1] *Baltimore*

To develop a high standard in teaching, the objectives of the course are of utmost importance. It is essential that a definite goal be established so that all of the time for instruction will be productive. The tendency to crowd the curriculum to a point of reducing the time of laboratory courses exemplifies the need of a well organized and efficient training program. This further suggests the necessity of employing the scientific method rather than the project method of instruction. A background of facts must be presented in a limited amount of time. Without awareness of these fundamentals, the teacher cannot adequately prepare the student.

Teaching in crown and bridge prosthesis may be accomplished more satisfactorily by the integration of all of the closely associated courses, stressing the relationships of the fundamental principles involved. The correlation of knowledge obtained in the basic sciences with the biological requirements of this course would save considerable time, eliminating the necessity for repetition of certain phases of histology, physiology, pathology and similar subjects. The dental materials course should

[1]Professor, Crown and Bridge Prosthesis, University of Maryland, College of Dentistry.

ground the student in the properties and manipulation of materials in a general way. Operative Dentistry should provide the basis upon which the abutment preparations for fixed partial dentures can be established. Unfortunately, because each department has a tendency to concentrate on its specific subject matter, this necessary correlation is too often lacking.

I should, therefore, like to list the following objectives in the preclinical teaching of crown and bridge prosthesis:

1. To impart to the student the fundamental principles involved.

2. To develop proficiency in the application of these principles in the laboratory.

3. To develop skill in using simple accurate technics.

4. To correlate the didactic and the laboratory instruction in the preparation for clinical practice.

The first objective, to impart to the student the fundamental principles involved, is essential in developing a foundation in any scientific field of endeavor. This basic preparation is accomplished by means of lectures in the theoretical aspects and by laboratory exercises in the application of accepted principles. The limitations imposed on reparative and replacement types of dentistry by the biological factors must be carefully considered. It is difficult to evaluate the many variables encountered in the mouth. From the biological point of view, the foundation is subject to many changes incident to disease, trauma, individual susceptibility and resistance. The students' use of a biological background is not limited to the selection of abutment teeth, but is also employed in the construction and the functioning of the restoration.

The mechanical aspects are more readily appreciated. Fundamental principles are freely employed in performing the mechanical phases of the preparation of abutment teeth and the construction of the restorations. The principles involved in developing the resistance and retention form of abutment preparations are derived from physics.

The responsibility of grounding the student in the application of principles of physics in restorative dentistry belongs primarily to Operative Dentistry. The relationship of such a background to the teaching of crown and bridge prosthesis is similar to the need of a knowledge of physiology preceding the study of pathology. After the teaching of these principles in cavity preparation, it should then be feasible to emphasize the variations imposed by the requirements of fixed partial dentures. Thus a close application of the basic principles in both reparative and replacement dentistry may be accomplished.

The second objective, to develop proficiency in the application of these principles in the laboratory, requires very little discussion. However, it may be pointed out that too often the procedures of abutment preparation are executed in a manner of duplication. The desk model of the particular preparation is copied by the student without due appreciation of the principles involved. This procedure may account to some extent for the failure of a student to correctly prepare an abutment tooth in a rotated position in the mouth. He is unable to visualize the completed preparation because his laboratory exercises with ideally positioned teeth in the dentoform were performed without proper consideration of the principles of preparation.

The third objective, to develop skill in using simple accurate technics, is very essential training. Because of the time limits of the dental curricula, it is necessary to carefully select accepted technics which will provide satisfactory instruction. It should be pointed out to the student that there are many methods of applying the same principles which will yield similar results. This directive will tend to eliminate confusion in his mind because of his knowledge of dental technics obtained from textbooks, the literature or association with a dentist. It further impresses on him the fact that the application of the principles is the important consideration. The failure of the practitioner of dentistry to realize this basic fact is apparent in his persistent seeking of a specific technic for rendering dental service. For example, in complete denture prosthesis the technic is emphasized, such as the Gysi, Hall, Fournet, McGrain or the "Ginsberg" technic. These various technics are in effect different methods of applying the same principles.

The fourth objective, to correlate the didactic and the laboratory instruction in preparation for clinical practice, constitutes the goal toward which all instruction is directed. The biological background must equip the student to diagnose the condition and plan the treatment. This knowledge contributes in a large measure to the judgment exercised in all operative procedures. It is responsible for intelligent designing and construction of restorations to meet the requirements of vital tissues.

The technical proficiency acquired in pre-clinical training enables the student to orient himself in the clinic and to perform the required procedures in an acceptable manner. There is an abrupt transition at best and the student's lack of confidence in his digital skill not only will delay progress, but will result in inaccurate preparations. The technical phase of training serves as one of the best means of eliminating those students hopelessly unfitted for continuation of the dental course.

In conclusion may I say that this short discussion of the objectives in pre-clinical teaching of crown and bridge prosthesis does not cover the subject completely. However, because of the time limit and because of my desire to present a motion picture demonstrating the application of fundamental principles, I am sure that brevity is justifiable.

B. *Discussion*

J. RAYMOND GILL, D.D.S.,[2] *San Francisco*

The objectives of pre-clinical teaching may be classified into five groups: first, the principles of cavity preparation in crown and bridge prosthesis; second, developing the technical skill of the student; third, the application of the basic sciences in the construction of prosthetic appliances; fourth, teaching the student to think and reason, and fifth, preparing him for his clinical work.

Teaching the fundamentals of cavity preparations to the student requires not only didactical instruction but repetition on plaster teeth and typodont models. The first exercises should be made on plaster teeth encompassing the principles of retention form, resistance form and parallelism of the abutment preparation, emphasizing the importance of histology as it applies to cavity preparation. These exercises should be repeated in each of the various types of preparations. These exercises then should be repeated on typodont teeth in the models, demonstrating to the student the instrumentation, the procedures and methods of handling the instruments. During the class period the instructor should attempt to correlate and explain some of the conditions that the student may expect to encounter in his clinical procedures. This then will teach him to think along the practical line when he will apply these fundamentals. Detailed instruction should be given each student with close supervision by the instructor. This should be followed by a test case in which the student completes the preparation on one plaster tooth or typodont tooth without supervision or correction from the instructor. When the test case is completed each student's test piece will be reviewed and the mistakes and the means of correction should be pointed out by the instructor. The preparation of the abutment as the foundation upon which depends the success of the bridge, should be thoroughly emphasized to the student.

I believe it is very important in teaching pre-clinical dental students, that as many of the various types of preparations for abutments as possible should be covered, in both technic and didactic courses. Due

[2]Professor, Crown and Bridge Prosthesis, College of Dentistry, University of California.

to lack of time it is possible to include in the technic courses only a few of the various types of preparations. In the didactic course we can include more of the various types of preparations and the variations of these preparations, including indications and contra indications. In the didactic course we should review the histology of the tooth as it applies in making the preparation; the procedure and the care of handling the instruments well as it applies on a vital tooth.

In the first technical exercise all students should make the same type of preparations and bridges but later on as they have further experience in the principles of cavity preparation, I believe that we should diversify our procedures dividing the class into groups and giving each group a different type of bridge to construct. This enhances the student's knowledge because he can see and study the various types in the technical exercises described in the didactic course. This will broaden his knowledge of crown and bridge prosthesis and will prepare him more adequately for the clinic. The typodonts on which he will construct his bridges should be mounted on an anatomical instrument so that he will get some idea of the different movements of the jaw. This will also give him experience in carving up the teeth, not only in anatomical form but as it may apply in function. Also in constructing his bridges on an anatomical instrument he will be applying mechanical principles and their application as previously taught along with tooth morphology and gnathodynamics.

Developing the technical skill of the student in handling instruments in making his preparations and completing his bridges as if to be used in the mouth, develops his digital skill. In carving the wax pattern in crown and bridge prosthesis the greater part or the entire crown of the tooth is reproduced. Unlike that of operative dentistry the student must or should have a better knowledge of tooth form and should develop digital skill in handling wax and reproducing the anatomy of the individual tooth in the wax.

As he progresses in his exercises there should be a definite improvement from one exercise to another. If there is no improvement then that student should receive closer individual supervision. It may be necessary for him to repeat or to be given special exercises. By this means it will lighten the load on the clinical instructors and the student will be better prepared to proceed in the clinic.

In the past ten or fifteen years the basic science courses have been developed to the point where we may now delegate some of the preliminary work in crown and bridge prosthesis to that department, such as teaching some part of preparation which is taught in tooth morphology

and applied dental anatomy. In taking impressions and in the use of different impression materials, wax manipulations, carving, the procedure of investing wax, and its elimination, and casting are given in physics and dental materials courses. These have been a great help and have lightened the load in teaching clinical crown and bridge prosthesis. By deleting the teaching of these above subjects, and in discussing and emphasizing their importance, we have been able to increase the number of exercises, and thus have prepared students better for their clinical courses. As these basic science courses improve and broaden out in their scope we may be able to increase these exercises, thus further enhancing their knowledge preparatory to clinical instruction.

The fourth and fifth classifications can be considered together. Most of the teaching that prepares the student to think and reason should be taken up in the didactic course. The clinical exercises that will fall into this category will be the study of prepared study models that were taken from actual cases. The students should be divided into groups during the course previous to the completion of pre-clinical courses. Models will be presented to them and they should make a diagnosis and a treatment plan for each case. With the models will be x-rays and the data of the condition of that patient which will include the number of missing teeth, the condition of the teeth, mobility, vitality tests, the health of the individual and all the necessary data for a diagnosis. The student then will discuss with the instructor the treatment plan that he would suggest for the case. This treatment plan would include the type of preparation and the reasons therefor. He must consider the amount of retention form and resistance form that can be obtained, and the various types of auxiliary retention that may be necessary to obtain adequate retention for the retainers. He must discuss the various types of pontics that will be indicated, the procedure to adopt in those cases where it is necessary to change in some respects the anatomical form in the opposing teeth so that functional occlusion may be obtained. The purpose of this instruction should be the study of the mouth so that it may be rehabilitated to give the patient a health service. This will prepare the student to visualize the changes that have taken place and the necessary procedures to correct the abnormality so that the finished appliance should function not only in the act of mastication but also as protection to the supporting structures.

Gnathodynamics should be emphasized in this part of the course. Also, the application of tooth form, cusp relation and increasing the efficiency by sharp marginal ridges, deep supplementary grooves and sluiceways,

which decreases the forces in the act of mastication and the direction of these forces so that there will obtain proper physiological function, that will stimulate the soft and hard tissues. There should be a definite correlation in teaching between the different divisions so that there will be no great overlapping of the subject material which will place the burden upon the student. It is necessary that we teach objectively and apply some of the teachings in one division to another where it may be of benefit.

In conclusion, in preparing the student in his pre-clinical crown and bridge prosthesis we must consider all the above factors so that when he gets into the clinic and begins work on living tissues he has a thorough background of preparation. He must be required to show proficiency in his work, aptitude in adjusting himself to his clinical work, and ability to think and reason. In this discussion it may appear to be an extensive course but if organized adequately with teaching material consisting of models, slides, motion pictures and with enthusiasm on the part of instructors, we have found it to have worked very satisfactorily. There is some chance for improvement, perhaps, if we reduce some of the exercises, but at the present time we have had adequate time and by reducing some of the steps required for checking, the student has progressed very well. I believe that the intermediary steps between the pre-clinical and the clinical have been difficult to get over. That is one reason why we have emphasized the use of study models, including x-rays and diagnosis. It gives the student a better perspective of what will confront him when he gets into the clinic. This means that adjustment is not so great, and he enters into the spirit of his work with some understanding of his problems.

OBJECTIVES IN PRECLINICAL TEACHING OF CROWN AND BRIDGE PROSTHESIS

C. *Presentation of the Subject*

RAY V. SMITH, D.D.S.,[3] *Iowa City*

The objectives of pre-clinical crown and bridge teaching will vary with different schools and will be altered to some extent by the position the course occupies in relation to other technical courses. At Iowa the major technical courses are arranged on a semester basis with dental anatomy and operative dentistry occupying the freshman year. Crown and bridge technic is taught the first semester of the second year with the last half of the year given over to partial and full dentures. We do not have a dental materials course where certain basic dental technics

[3]Professor, Crown and Bridge Prosthesis, College of Dentistry, State University of Iowa.

are taught, but we do have a course in metallurgy where certain dental materials are studied, and this helps to some extent.

The *first* objective of any course, it seems to me, is to define the subject and to develop a suitable terminology. Unfortunately, we are not all agreed on what crown and bridge prosthesis should include. Last year the partial denture section voted to abandon the term removable bridge in their effort to formulate definitions. Does this mean that we should confine our efforts to the repair work of badly broken down teeth with crowns and to fixed bridge work?

I wish the problem were as simple as the formulation of a definition but it does not seem to be. We do one removable bridge, so called in the crown and bridge technic course, and six fixed bridges. In the clinic the division hinges on whether the case is unilateral or bilateral. If unilateral, the crown and bridge department handles it but if the case is bilateral, it goes to the partial denture department. This seems to work out from a practical standpoint better than to attempt to make the division on the basis of teeth and tissue support. While we agree with the proposition that one definition will cover both the removable bridge and the partial denture, it does place the responsibility of construction entirely in one department.

We, as teachers, are still somewhat confused as to terms, and it is my hope that this section will discuss some of them. The term, pontic, is quite generally accepted and it is gratifying to see it replace the unfortunate term, "dummy" which prevailed for so long. We hear the terms abutment, attachment, and retainer used interchangeably which is very confusing to the student. Again the Carmichael crown, the ¾ crown, partial veneer crown, and Tinker crown are also confusing. It is my belief, therefore, that in order to meet our first objective of adequate definition and the acceptance of suitable terms, this section might profitably give this matter some thought.

The *second* objective is the introduction of new materials and their use in the construction of prosthetic appliances. A suitable textbook on dental materials should be a requirement and the lectures on these materials should be supplemented by assignments in the text. Plaster of Paris, impression materials of various kinds, gold and solder alloys and porcelain are a few of these materials. It is only after a thorough knowledge of these materials has been gained that they can be put to use successfully in the construction of crowns and bridges. Where certain materials have been presented in previous courses it remains only to adapt them to the work in hand. For example, our students come to us

with a good working knowledge of amalgam, cements and inlay wax, gained previously in operative technic and this lightens our load considerably. The criticism, however, of this method of presentation of materials is that they are usually slighted. It is my belief that a well organized course in dental materials will do a better job. If the study of these materials could be put on the research level it would result in a better appreciation of their limitations and use. It would also encourage further study after graduation. Students coming into dentistry today are fully capable of meeting their problems on a high level, and if we do not encourage the spirit of research we are not meeting our full responsibility. To my mind, the study of new materials, and their adaptation to restorative dentistry is one of our major objectives.

The *third* objective includes basic procedures and techniques which weigh heavily upon us as teachers. I shall mention two of these for which we are especially responsible. The first is the art of soldering without which any dentist is seriously handicapped. Soldering is one of the most difficult techniques to acquire. In free hand or open flame soldering we are helped considerably by the orthodontia department, but in the matter of investment soldering it is up to us. Our first bit of technic in the crown and bridge course is the soldering of bands and the student must become proficient at it before he starts his first crown. We like to construct bridges in units and solder these together in order to get as much experience as possible. The proper trimming of investment seems difficult for students to master and one of our rigid rules is that the student must show his trimmed investment to the demonstrator before placing it on the fire for heating.

The second of these basic technics is casting. The Operative Technic Department introduces this procedure and we have only to adapt it to our particular situation. We use the same investment and casting technic throughout the entire school except for complete veneer gold crowns where we change to another investment in order to gain more expansion. Where large groups are working together in the laboratory it is necessary to have a simple technic—one which does not require expensive equipment or consume an undue amount of time. We teach the use of both the pressure and centrifugal machine and after each has been mastered it becomes a matter of choice with the student as to which one he uses.

The *fourth* objective consists of laboratory exercises. The objective here should be to prepare the student for clinical experience. In order to achieve this goal the exercises should be planned to afford a maximum

of experience in the more common types of bridge construction. It is most important that the student have a textbook to refer to and not have to depend entirely upon the laboratory manual however good we may think it is.

For the purpose of this discussion I will consider retainers and pontics separately. In the anterior part of the mouth we are restricted mainly to inlays and partial veneer crowns as fixed bridge retainers. It might be well to incorporate either a class 3 or class 4 lingual dovetail inlay in the laboratory technic in order to demonstrate the principle of the rest lug in preventing rotation of abutment teeth. Beyond this requirement I see no reason for including inlays in the anterior part of the mouth.

The partial veneer, or ¾ crown, is the principal retainer in the anterior part of the mouth and should receive detailed consideration. The student should be given the opportunity to construct several of these crowns and his experience should include both upper and lower anterior teeth. He should be instructed in both the direct and indirect methods of obtaining the wax pattern and have experience in both.

The complete veneer gold crown, the partial veneer crown (¾ crown) and inlays are acceptable retainers in the posterior part of the mouth. If the operative technic department does as good a job in your school as it does in mine, I can see no reason for using more than one inlay in the laboratory routine. However, the inlay as a bridge retainer, its usefulness and limitations should be thoroughly discussed in order that the student might not become over enthusiastic in its use. We use one M.O.D. inlay in a lower bicuspid in order to include the principle of breaking stress in the laboratory technic.

The use of partial veneer crowns as retainers in the posterior part of the mouth should be given consideration and at least one such retainer included in the laboratory experience. Patterns for these retainers are difficult to obtain by the direct method and a completely indirect or combination of the direct and indirect methods should be taught.

The complete veneer gold crown is our most dependable retainer as regards strength and longevity in service and should have a prominent place in the laboratory technic. Several of these crowns should be made. If made by the casting method it requires the carving of the complete crowns of the teeth in wax and gives the student an opportunity to demonstrate his knowledge of dental anatomy which is so essential to good crown and bridge work.

In the consideration of pontics, I realize that technics differ in diffferent parts of the country especially as to pontic construction. At Iowa we

are strong for pin facings and the student probably would not get experience with interchangeable facings unless it was in the technic laboratory. For this reason we feel justified in departing from clinical procedure in order to give the student a wider experience. We make twelve pontics in all for fixed bridges. Two of these are constructed with Steele's trupontic facings and are replacing an upper central and lateral. Another is a Steele's sanitary pontic replacing a lower first molar. The rest are constructed with pin facings except for the replacement of two lower posterior teeth with all gold sanitary pontics. We feel that the making of eleven pontics varied in construction as indicated above should give sufficient training in this area.

The course in ceramics is given in the junior year and is taught by the clinical staff. There the student does one complete veneer porcelain crown and in addition is required to do a practical case some time during his two years in the clinic. In our pre-clinical technic laboratory the student is required to make a preparation for a full porcelain veneer crown, take impressions and carry the case through the making of the amalgam die, but he does not bake the porcelain crown. We do bake a porcelain tip for one of our bridges, and we reglaze the porcelain on the Steele's sanitary pontic. In the laboratory we use the Steele's furnace, low fusing porcelain and Steele's super-glaze. If some of the students are especially interested, and have time, we let them do some staining. By this method we hope to stimulate the student to at least bake porcelain tips and to reglaze porcelain which rests against the tissue ridge. The low cost equipment illustrates what can be done without too much financial outlay. We do not recommend that porcelain jacket crowns be made with the low fusing porcelain, but we do believe that the general practitioner could bake porcelain tips, reglaze porcelain, and do staining very easily and inexpensively.

The *fifth* objective is impression taking. Most technic departments are handicapped in the matter of impressions suitable for the construction of fixed bridges. The best answer to this problem would be to pair off the students and have them take impressions of each other with impression materials which will be used in the clinic. Plaster or plaster compounds seem to be the most suitable materials for the purpose. If a pre-clinical impression course could be established where all kinds of impression materials could be studied and experience gained in their use, it would be a great help to the student when he goes to the clinic. All departments concerned with impressions of one kind or another might collaborate in setting up such a course. I believe that it would help relieve the teach-

ing load on several of the clinical departments and make it easier for both the student and the patient in the clinic.

There is one other thing which might be considered and which gives the pre-clinical teacher of prosthetic dentistry considerable concern. That is the matter of dropping obsolete technics. We have dropped the cast occlusal crown in favor of trying to perfect the technic for the full cast crown. I am not sure that the cast occlusal crown is obsolete in all parts of the country. Dowel crowns are not stressed in our pre-clinical course either, and very few of the students get to make them. Those who wish to take a Board examination in a state which requires a flowed Richmond crown are very much worried and we give them special training in preparation for it. We try to parallel our technics with those found useful in the clinic and we discard crowns and procedures which are not used there. One of our considerations, therefore, in this session might be to discuss when to discard old technics and how far to go with new. Should pre-clinical instruction include one-piece castings for fixed bridges which are made possible by the use of the hydro-colloid impression? Again, we wonder if the time has not come when the acrylics should be introduced into the pre-clinical course as a crown and bridge material.

In conclusion I shall enumerate with some elaboration the objectives set forth in order that they may be more easily tabulated for the discussion to follow:

1. Definitions, terminology, and course content especially as it relates to removable bridges.
2. The requirement of textbooks; one on dental materials and another on crown and bridge construction.
3. The presentation of new materials and their application to crown and bridge procedures.
4. Basic procedures and technics, especially soldering and casting. Should materials and basic technics be taught in a dental materials course or introduced by teachers in technical subjects?
5. Laboratory Exercises.
   (1) Retainers.
      a. Inlays, and partial veneer crowns in anterior part of mouth.
      b. Inlays, partial veneer crowns and complete crowns in the posterior region of the mouth.
   (2) Pontics.
      Considering the use of interchangeable facings and pin facings.
6. Ceramics in the pre-clinical instruction in crown and bridge. What should be our objective in this field?
7. Impressions technic in pre-clinical experience. The possibility of a course in impression taking.
8. Consideration of obsolete technics.

D. *Discussion*

JOSEPH LEE CLEVELAND, JR., D.D.S.,[4] *Buffalo*

In discussing Dr. Smith's paper, I wish to say that the University of Buffalo's Dental Department is undergoing a transition brought on by the extension of our long standing three-year plan to a full four-year course. Conditions have given us a chance to scrutinize and reorganize our present teaching system.

(1) *Definition and Terminology:* The problem of terminology and the definition of crown and bridge prosthesis will continue to be a problem because of the variance of opinion between this and the denture section. As suggested by Dr. Smith, the subject of terminology should go to a committee in our own section for the purpose of study and of delineation of terms and definitions which may overlap and are outworn.

Pre-clinically we follow in a strict sense the standard definition of our subject; clinically we utilize opinions from the diagnostic, periodontal, denture and crown and bridge departments for a practical definition of the subject.

(2) *Text Requirements:* Crown and bridge prosthesis to meet Dr. Smith's objectives should be supplemented by literature which answers these questions:

a. Basic and fundamental technics.
b. Composition and handling of dental materials.
c. Variations of standard technics for unusual mouth adaptation.
d. Advanced work in gold, platinum, porcelain, and plastic manipulation.

(3) *Presentation of New Materials:* As Dr. Smith proposes in his paper the time honored materials must be taught thoroughly for a basic knowledge; the new should be presented and discussed so that upon completion of prescribed work and entrance into practice, materials and their accompanying technics will not be too unfamiliar. Because of the rapid development of new materials in all phases of dentistry, we cannot depend on textbooks or manuals to keep the student abreast of the times; hence our objective in these matters must be formulated along such lines as:

a. Careful, advised culling by entire faculties.
b. Familiarizing ourselves with new materials and their handling.
c. Accompanying their introduction with actual working demonstration and visual aid.

(4) *Basic Procedures:* We can happily report on the scheme advised by Dr. Smith as to relegating materials and procedures to two separate

[4]Professor, Crown and Bridge Prosthesis, University of Buffalo, College of Dentistry.

courses. It has required much effort to dovetail the mass of material of a dental materials course to bridge the gap between theory and practice; but, with the help of demonstration and visual aids, this has been overcome. A basic technic course, incorporating various prosthetic exercises, accomplishes the same result, and with little adaptation meets our special needs for each department.

(5) *Laboratory Exercises:* Dr. Smith's pattern for laboratory exercises is paralleled in our department with emphasis on strength and longevity of service. Because of our limited time as mentioned before, we stress in retainer construction:

a. Full cast crown.
b. Cast occlusal crown.
c. Partial veneer crown.

We do incorporate the stress breaking principle, using an inlay for one of our regular exercises and also in preparation for State Board requirement. Impressions are fully covered, basically on the required bridge construction, but also in the various advanced technics in small clinics by staff members.

Governed by the time factor again, our use of pontics is the very utilitarian Steele's trupontics, porcelain biting edge, flatbacks, etc. Variations regarding pin facings, short bite manipulations, baked saddles are handled as before in group clinics.

(6) *Ceramics:* We begin the teaching of ceramics in the junior year. The hope that some of this work will carry on in general practice is evidenced by Dr. Smith in his remark on this subject. The advent of full and partial plastic veneers has effected a proposed change in our division. In part two of our crown and bridge prosthesis we carry a typodont tooth through all the stages of preparation, impression, and manufacture, for a porcelain, and a plastic crown, and inlay.

At this time all pontics from part one are reglazed in an effort to emphasize this often neglected procedure. Staining, porcelain tips, and baked saddles are not a part of our work but become senior seminar studies. A full cast crown is made for an anterior tooth and the labial is veneered with plastic.

(7) *Impressions:* Dr. Smith's suggestion of a consolidation of all impression technics into one course would, in effect, relieve the load from teaching heads, freeing valuable time otherwise lost. From personal experience, we can all see the merit of injecting a human touch by having one student work for another.

(8) *Consideration of Obsolete Technics:* Dr. Smith poses the ques-

tion "When—do we—discard old technics and how far—do we—go with the new?" Widespread successful use of a material and its required technic should antedate a previous technic in a strict teaching sense. Obsolescence of crown and bridge technics is determined largely by:

a. Personal, local interpretations of varying conditions under which appliances have been successes or failures.
b. Introduction of and successful use of new materials.

This undertaking should be a joint procedure by clinical and preclinical teachers, arising from compounded tenets of all concerned. By the same token, we are teaching today, both the cast occlusal crown and the dowel crown.

6. THE PANEL: TEACHING DENTISTRY FOR CHILDREN

Should the Teaching of Dentistry Be Completely Separated from Other Departments of the Dental School?

Panel Participants

a.

RUTH MARTIN, D.D.S.,[1] *St. Louis*

This question has been a subject for consideration since 1935 when the report of the Curriculum Survey Committee of the American Association of Dental Schools failed to give dentistry for children the status of a separate program of instruction. In this report the teaching program in dentistry for children was submerged in courses such as operative dentistry, orthodontics, dental anatomy, dental prosthetics and others.

Although there had been an indication of earnest endeavor to give adequate attention to the teaching of dentistry for children in these various courses, the results of the survey of the College Curriculum Committee of the American Society of Dentistry for Children show a definite lack of standardization of objectives, of terminology, of teaching methods and technical procedures. In 1941 the College Committee submitted a report on "The Undergraduate Program in Dentistry for Children." This report included consideration of the advisability of a separate program and submitted an "Outline of Minimum Requirements" for such a course. No better source than this report is available to indicate the advisability, and the reasons why, the teaching program of dentistry for children should be separated from other departments. A quotation from this same report reads as follows: "Attention having been

[1]Professor, Dental Pediatrics, Washington University, School of Dentistry.

called to the trend toward the consideration of the child as a unit in preventive treatment, something may be said in defense of a separately directed teaching program in the undergraduate curriculum. At the 18th Annual Meeting of the American Association of Dental Schools the objectives of an adequately taught program in dentistry for children were reported following a round table conference. Although dentistry for children like medicine for children consists of a general practice for young patients, certain specific problems develop in a general practice for children which differentiates its procedures from those practiced for adults. In the practice of dentistry for children the first problem which develops is one of patient management. Few dentists can approach an appointment with a two year old patient with equanimity. The first objective, then, is instruction in and the demonstration of the management of the child behavior. Because primary teeth present differences from permanent teeth in anatomical form and because their roots are in the process of resorption, special technics for their management must be developed and taught to students. Similarly, the incomplete calcification of the newly erupted permanent teeth presents special problems of management in the mixed dentition. Since the children's operator incurs a definite responsibility for the future occlusion, oral health and, not infrequently, the general health of his young patients, the third objective in undergraduate teaching is the presentation of information from a variety of areas which may assist to interpret growth and development—dental caries research, nutrition, physical diagnosis, pediatrics, anthropology, orthodontics, embryology, biochemistry and endocrinology. Since the practice of adequate dentistry for children requires an educational technic in order to show parents that certain dental health habits are essential, to convince them of the value and hence, the necessity for the preservation of the primary teeth, and to teach small children correct oral hygiene habits, the fourth objective of a well-taught course is the presentation of the education technics to be used with parents and children. Probably the greatest obstacle to the practice of dentistry for child patients is the failure of the dentist to secure adequate fees, hence a fifth objective, following the round table conference already mentioned, was added to the teaching program, effective treatment planning."

However, I am aware that the primary objective of undergraduate dental teaching is to prepare the student for the general practice of dentistry. I also realize that the teaching of dentistry for children should not be so completely separated from other departments as to become autonomous. I do feel that integrating this phase of dentistry into other courses would necessitate teaching methods that would be chiefly con-

cerned with remedial measures. Such remedial measures are applicable only after dental diseases have produced recognizable characteristic lesions and anomalies. In addition to adequate training for remedial measures, which will always be necessary for most patients, the objectives should embrace preventive or protective methods against dental disorders. Dental service to the child patient does not mean the treatment of miniature men and women with temporary procedures. It means more than the same treatment of the same dental diseases found in adult mouths. Dental service to children should not be considered a by-product of general dentistry. In the three periods of young life according to age—infancy, childhood and adolescence—there are constantly changing patterns due to development and growth, in contrast to the relatively steady or fixed state encountered in adult life. Dentistry for children has its own ranges and horizons and gives to general dentistry as much as it receives from it.

I doubt that instructors in orthodontics, operative dentistry, or dental prosthetics have the time or inclination to emphasize, evaluate and correlate the fundamental principles that are so necessary for adequate training in this phase of dentistry. With emphasis, evaluation and correlation of all sciences in his undergraduate training a general practitioner will be a better general practitioner and will not show a tendency to shun the child patient. If all reports seem to suggest a separate clinic for dental service to children—and all reports do so suggest—then why not a lecture course also separate from other lecture courses? If the reason for a separate clinic is for the psychological effect upon the child patient, why wouldn't a separate lecture course be advantageous for the psychological and the educational effect upon the student?

From the foregoing it seems imperative that the dentist giving service to young patients becomes well trained and alert to determining the significance of the findings in a changing oral structure as well as adequate training in methods and procedures in preventing and restoring dental disorders and in preserving dental health. Emphasis on this service in undergraduate teaching offers numerous opportunities for advancing the cause of national dental health. Economic conditions and events have helped to set the tides of feeling in motion for dental and medical social security. The Children's Bureau, since its creation in 1912, has done much to focus attention on the child as a treatment unit. Since the time of occurrence and extent of dental service can be more accurately predicted than medical service, it is probable that the bulk of emphasis of social security dental programs will be on the child as a unit of treatment.

In his *Social Principles of Education*, Professor G. H. Betts says, "The

professional pursuits belong to a relatively advanced stage of social development. They have their origin in the necessity for meeting crises in experience."

b.

L. S. PETTIT, D.D.S.,[2] *Columbus*

The subject for discussion "Should the Teaching of Dentistry for Children Be Completely Separated from Other Departments of the Dental School" is one in which there exists a wide variation of opinion and there are valid reasons for a careful consideration of both the pros and cons.

My personal feeling is that the objectives of such a course of study can be best accomplished by a separate and recognized department. Naturally there are many areas of overlapping, but that in itself is an important reason for the feeling that the teaching of the principles should be administered by a separate department.

A recognized department has a favorable psychological effect upon the participants, namely the faculty, the student and the public.

For various reasons there are, and rightly so, members of the faculty who are not particularly interested in some of the phases relevant to the principles and technics of teaching dentistry for children. They are naturally engrossed in their own field of endeavor and may not feel able or willing to acquaint themselves sufficiently with the detailed material being taught for a particular course. Thus they may be hesitant to participate in clinical teaching in fairness to themselves and the students.

It is not implied that undergraduate teaching should be carried on with the idea of developing specialists. In fact quite the opposite is true. I believe one of the most critical problems facing the profession today is to recognize that the real hope of accomplishing a successful dental program and caring for some of the social problems is for the general practitioner to accept and care for his share of child patients. Therefore the objective of the undergraduate course should be to equip the student so he feels competent and will therefore accept his fair share. I have the highest regards for qualified specialists but most cases are not cases for the specialist.

Again the curriculum in the dental school is pretty well loaded. Unless the student is assisted in securing and utilizing the material necessary to meet the requirements of a course, he may become discouraged and lose interest, thus, the most essential factor of successful teaching is lost.

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[2]Instructor, Dentistry for Children, Ohio State University, College of Dentistry.

With a department entrusted to teaching a course and assuming responsibility for the same, the student will have recourse to guidance and opportunity for correlating his learning in the whole field of dentistry. Too often, from the pressure of fulfilling factual requirements, the student has a tendency to lose the proper perspective which can only be maintained from careful correlation of all his fundamental training.

It is recognized that all the national, state and community programs must be based upon a broad conception of preventive dentistry if dental diseases of the future are to be controlled. This implies that care must be started with the young patient and treatment followed in a regular and systematic manner. This naturally is one of the duties of an organized department to help formulate the type of program which would best serve the needs of the public.

All phases in the practice of dentistry have their particular problems. After the arches and teeth have reached their adult proportions it is a question of maintenance and replacing lost function. In the practice of dentistry for children, the ideal is to try to direct and treat the developing mechanism so that it will reach completion in as nearly normal condition as possible.

Since the growth and development of the face, arches and teeth are a changing mechanism, there are problems that merit special consideration: calcification, eruption and exfoliation of the primary teeth, recognition of developing abnormalities and normal development of the second dentition—all present problems at times.

Also in the treatment of fractured young anterior teeth, the early loss of both primary and permanent teeth, the too long retention of primary teeth, the care of pulp conditions of young teeth; all present problems requiring a consideration of special operative procedures.

In summary I believe the teaching of Dentistry for Children can best be accomplished by a separate department for the following reasons, but it is most essential that it be kept on a general practice level:

1. A recognized Department has a favorable psychological effect upon the faculty, students and public.
2. Unified teaching.
3. Interest of instructional staff and assumption of responsibility.
4. A focal point of source material and correlation of same to other phases of dental teaching.
5. Care and supervision of a growing and changing mechanism presents special problems.
6. Consideration of special operative procedures to meet specific problems.

C.

WILLIAM R. WOLFE, JR., D.D.S.,[3] *Louisville*

Despite the increasing interest and emphasis on specialization in dentistry, the prime purpose of the undergraduate curriculum is to train the student for a general practice. It is generally agreed that the burden of dental care for children must be carried by the general practitioner. If each general practitioner carries his share of child patients in his practice, a great deal of the dental needs of children will be satisfied. An essential part of the undergraduate instruction in dentistry for children should be to teach the student routine dental service for children. Therefore, the sooner the student becomes familiar with treating the child, the sooner the traditional barrier is broken down and the more readily will he receive children as dental patients.

In the clinic at the University of Louisville each student is expected to do as complete a service as possible for each patient assigned to him, whether the patient is a child or an adult. He is expected to do a complete diagnosis, submit a plan of treatment for each of his patients, and to carry out this treatment plan. In carrying out his treatment plan, the student will be supervised by several different departments and in any one individual patient he may treat gingivitis, perform root canal therapy, make several individual restorations of various types, a fixed partial denture and a removable partial denture. The number and variety of his clinical experience are determined by the patients assigned to him and there is very little passing around of patients.

The curriculum in clinical pedodontics begins with the first semester of the junior year and continues through to graduation. Included among the first group of patients assigned the new junior student is a child patient. Just as for all his patients, he is expected to do a complete treatment for this child patient. So he immediately begins to think along the lines of the mechanics of carrying out the indicated treatment rather than first having to overcome a psychological barrier because the patient is a child. The argument that a student fresh in the clinic is not competent to manage child patients is not necessarily valid. The initial procedure intended to introduce dentistry to the child is simplified and also serves to introduce the junior student to intra-oral procedures.

Child patients are assigned to students on the basis of the variety of dental conditions which the patients present. In order to give the student a well-rounded experience in clinical pedodontics, he is expected to complete eighteen Class II amalgams, or the equivalent. He receives

[3]Instructor, Dentistry for Children, University of Louisville, College of Dentistry.

credit for two Class II amalgams if he does an MOD on a molar, and he receives credit for one Class II amalgam if the cavity is a disto-lingual preparation on a cuspid. Of the required Class II amalgams, the junior student is expected to do six and the senior student is expected to do twelve.

By graduation time the student is expected to have performed three pulpotomies, one of which should have been done in his junior year, and two in his senior year. Some students, after they have done two pulpotomies, are difficult to restrain from doing pulpotomies. The first one is done "cook-book" style, the second one the student does with some intelligence, and from then on it is a simple routine procedure with him.

One of the problems encountered is the teaching of pulp chamber anatomy. An attempt is being made to teach the student the orientation of the pulp to the external surfaces of the tooth. In the sophomore oral medicine laboratory the student makes several dissections and drawings of extracted primary teeth and studies the pulp in relation to the external landmarks. Whenever a junior or senior student does a good job of careful excavation and avoids an actual exposure we recognize that he is putting to excellent use what he learned in the sophomore laboratory and he is awarded appropriate credit. This problem has still not been satisfactorily solved, but it is our feeling that the treatment of the exposed pulp is the best method of teaching pulp chamber anatomy.

The student is required to make three space maintainer appliances. Two of these are technic pieces of the classical design and on models, and the other is a practical case and may range all the way from a simple orthodontic band and loop to a removable partial denture which may or may not carry teeth. He is expected to make two fractured anterior restorations. One of these is a technic piece and is done in his junior year. It is desired that the other be a practical case but the number of patients presenting a fractured anterior in the clinic is so few that often the student graduates with simply his technical experience. He is expected to perform six prophylaxes and six diagnoses for child patients. These requirements are grouped together because the student is expected to do a prophylaxis and a diagnosis for all patients newly assigned to him. Frequently the student will receive credit for a second diagnosis of the same patient, one of his child patients for whom he had completed treatment during his junior year. This practice on the part of the student is admirable and, although not required, it is encouraged since it gets the student in the habit of periodically recalling his child patients for re-examination.

The junior student is required to select two of his child patients whose dento-facial growth and development he will observe during his junior and senior years. The chief aim of this project is to emphasize the fact that the child's jaws are constantly growing and changing. The student learns to make records and subsequently from these to determine the direction of growth. A growth observation case may be one in which the student simply observes the normal progress of growth and development. It may be a case for which a space maintainer has been constructed and the student watches the development of the succeeding permanent tooth. Some of the cases for which partial dentures have been constructed have been particularly good since the student has had to alter the partial denture to make room for the erupting permanent teeth. Other cases have been good from a negative standpoint in that the patients, being indigents, have not been able to afford the indicated special appliances. Therefore, the student may observe the development of a faulty occlusion. The student may also satisfy the growth and development requirement, as well as the one for a space maintainer, by treating a minor malocclusion, such as an anterior cross bite, with an active orthodontic appliance. The orthodontic treatment is designed to guide an individual tooth or a few teeth in a normal direction and not to treat a major malocclusion.

The Departments of Radiology and Oral Surgery regularly have junior students assigned and during busy times this student on assignment will make the indicated radiographic exposures and, under supervision, do the indicated extractions. However, it is a regular occurrence during times when a student is not regularly assigned to these services, for a student to take a patient newly assigned to him to the x-ray department and personally make the necessary exposures. He may subsequently visit the surgery department where he may also do any indicated extractions.

Since the student has received considerable experience in pedodontics during his junior year, there is no hesitation in sending a senior student to one of the Health Center Clinics and to a crippled children's hospital where he performs routine dental service for children, but where step-by-step progress is not supervised so closely. He is given much more responsibility for the complete excavation of caries and the decision as to whether or not to place a cement base under his restorations, as well as the decision of whether a pulpotomy or an extraction is indicated. His administration of local anesthetics is not individually supervised, and all in all he conducts himself in these outside experiences much more as he eventually will in his office.

Summary

The clinical experience of junior and senior students at the University of Louisville has been briefly outlined. It has been emphasized that these students carry on their clinical practice for children in the main clinic just as a general practitioner would in his office.

It has been debated by our faculty whether a separate children's clinic would be desirable if such facilities were offered. On the basis of our experience we feel that such a separation would emphasize the unusualness of the child dental patient, and that philosophy is the opposite of our concept of the practice of dentistry for children.

"Among the aims of public education is the attempt to develop Man Thinking, to develop that feeling of intellectual curiosity in all things, that incessant questioning, which has resulted in whatever human progress there has been, and which has been one of the chief factors in the rise of American civilization."

Charles Garrett in 'The Reader Replies,' *American Scholar*, 19, 494; 1950.

PLANNING FORCES IN TEACHING ANATOMY

H. HENRY WEISENGREEN,[1] D.D.S., and OZRO B. WISWELL,[2] M.S.
University of California, College of Dentistry

The man who would make a study of the problems of dental education encounters at the outset of his work difficulties which seem endless and insuperable. He finds that his problem, far from being the simple definable discipline which first appealed to him, is the generator of a series of other problems almost without limit. He finds, too, that those ideas whose novelty was so thoroughly satisfying and "original," may turn out to be neither his own nor the better exposition of another's. Besides these difficulties, inherent in dental education (and research), there are scruples of taste, decorum, and academic self-repression to hamper one's free expression. The most objective problems seem to be often a vehicle of personal feeling. And then, again, one hesitates to strike that other note, the note of belligerence. Active polemic is, to be sure, a sign of healthy vigor. But keen perusal of our dental journals inspires the thought that perhaps we are too interested in "healthy technical vigor," per se, too absorbed in "traditional habits" of teaching to be fruitfully concerned with basic tenets and the "philosophic concept and approach" to carefully organized dental student planning and education. Be that as it may, this is written with a full, perhaps an exaggerated, consciousness of these difficulties, does represent assumptions, theories, and results attained by our efforts. This outline will, it is hoped, prove a period of continued development to both student and teacher and not one of "static" progress or studied retrogression.

We do not propose to lessen and/or obliterate the student's desire or tendency toward important "search for details" nor to *supplement the text*, rather that the *text supplements and complements the discussion outline*. In this manner the student will have greater retention in the general evaluation of the particular course of study in which he is engaged. In a broad sense education is not a mere collection of isolated thoughts or ideas. Such a deluge of concept does more harm than good. Professional training (and we are here concerned with that phase of the healing art called Dentistry) is at once general and concrete, critical and intuitive. Dental planning and teaching must not be as mere "barbaric

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[1]Assistant Professor, Anatomy, Chairman, Section of Anatomy, Colleges of Dentistry and Pharmacy, University of California.

[2]Formerly Instructor in the Department of Anatomy, Colleges of Dentistry and Pharmacy, University of California; now Assistant Professor, Anatomy, University of Texas, College of Dentistry.

flashes of thought," but by a coordinated broad philosophy to prevent spells of decadence, slacking of effort and academic boredom.

Dental students as a class will not repudiate their responsibilities or obligations, but they have need of vision and the penetration of provocative teachers. The integration of high purpose and associated thought is the finished package for each graduating student to carry away.

The term "discussion outline" is used with a planned purpose, that of informing the student that he is invited to participate in the general organized thought of his class as directed by the instructor. It is a migration from the "common-place lecture." *We continue, fallaciously enough, to teach traditional subject matter by traditional methods and to evaluate by traditional tests.* If the studies reviewed in this paper show anything they indicate that to obtain any objective of science instruction, we must teach for that objective.

The reaction of our students to this innovation has been one of complete satisfaction. This is evidenced by their wholehearted cooperation, their expressed sentiments—"this discussion outline makes it easier to organize our thoughts and studies of the vast amount of anatomy material," "anatomy isn't the bugaboo I imagined it to be," "we know what is expected of us in dissection and examinations." We do not recount their gratifying responses with a viewpoint to self-glorification, but rather as a series of facts which tend to substantiate the soundness of this, our "discussion outline." Anatomy, to be sure, is a "rugged" study, but the element of mental trauma (imaginative or real) will be greatly lessened if this method of presentation is established and followed. Our discussion outlines are not intended to serve as "syllabus," "primer," "Phi Bate," or "seminar" notes. Flexibility rather than constancy and rigidity is the theme and keynote of our discussion outline.

Summary

We are led inevitably to the conclusion that these discussion outlines, plus the anatomical illustrations contained therein, have a deeper sense of rational order and clarification than just the commonplace "learning" of anatomy. Our approach seems to have yielded the clearest, most precise, and most reliable grasp by the mind of the student of the qualitative and quantitative aspect of this study. We discourage the teaching and communication of our subject as a series of *isolated and established facts*. Rather do we concentrate on the integrated planned forces as the outlined objective. Therefore, teaching for that objective, we test for that objective to the end that the student will develop a

coordinated concept of the subject and that this systematic and organized thought will carry over naturally into his professional and practicing philosophy.

"The excitement of teaching comes from the fact that one is teaching a subject one loves to individuals who are worth more than all the money in the world."[3]

The following is our teaching method in outline:

Discussion Outline

Anatomy 115B—Head and Neck—The Face

I. General Considerations

A. *Topographical*

1. *In the young* (infants)
   a. greater amount of subcutaneous fat
   b. lack myological development
   c. greater cranial size as compared to size of face
   d. shallow nasal fossa
   e. small maxillary bones
2. *Old age*
   a. integument becomes thinner and wrinkled due to disappearance of subcutaneous fat
   b. onset of senile keratosis
   c. dilation of superficial vessels on nose and cheek
   d. tending absorption of the alveolar process
3. *Langer's line of cleavage* (see Fig. 1)
4. *Color* in health and disease
5. *Supra-orbital* arches
   a. dividing line between the upper third of the face and the forehead part of the cranium
   b. internal angular process of the frontal bone articulating with the lacrimal bone and the nasal process of the superior maxilla
   c. terminate in the external angular processes which articulate with the malar bone
   d. size of the orbit and size of the

Fig. 1. Langer's Lines of Cleavage of Skin.

[3]Phelps, W. L.: The Excitement of Teaching. Liveright Pub. Corp., N. Y. 1931.

eyes do not vary much in different individuals, apparent differences due to length of the palpebral fissure

6. *Palpebral fissure*, the aperture between the two eye lids and extends from the nasal canthus to the temporal canthus
7. *Tarsal cartilage*, a thickened portion of the eye lid
8. *Lacrimal ducts* (puncta lachymalia), observed near the nasal canthus, lower is larger and external
9. *Internal palpebral ligament*, (tendo oculi or tendo palpebrarum), can be palpated after drawing the eye lid outward or forcibly closing the eye
   Posterior to the palpebral ligament is the lacrimal sac
10. *Nasal duct* extends from the inner angle of the eye to the inferior nasal meatus (just under the inferior turbinate bone—is about 2 cm in length, constricted in the middle)
    The inferior opening in the nasal mucous membrane is a slit but with quite a large osseous canal (explore this with a probe on your specimen)
11. The *infra orbital margin* or lower border of the orbit is formed by the superior maxillary and malar bones (palpate it)
12. The *glabella*, a flat triangular eminence situated medially of the two external extremities of the superciliary ridges
    a. inferior to the glabellal apex is the nasal prominence formed by the paired nasal bones
    b. size and morphology of the nasal bones are responisble to some extent for the general facial expression
    c. the difference in these bones is also responsible for racial facial expression

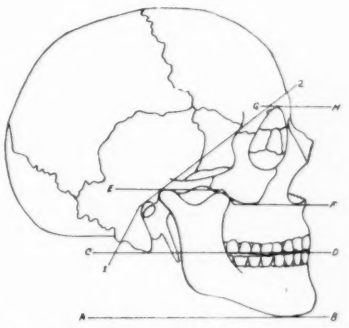

FIG. 2. The norma lateralis of the skull divided into face and cranium with lines of demarkation of thirds of the face.

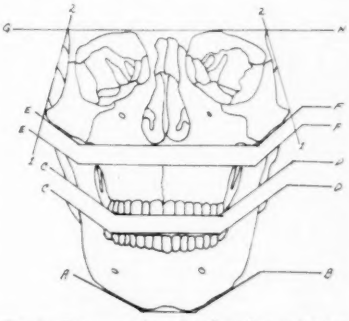

FIG. 3. The norma frontalis of the face indicating divisions of the lower third, middle third, and upper third.

Interpretation of anatomical and/or surgical divisions of the face.

Boundaries (See Figs. 2 and 3)

A-B— Boundary line between superior border of the neck and inferior border of the lower third of the face.

C-D—Boundary line between the superior border of the lower third of the face and the inferior border of the middle third of the face.

E-F— Boundary line between the superior border of the middle third of the face and inferior border of the upper third of the face.

G-H—Superior border of the upper third of the face.

1-2— Posterior boundary of the face.

d. attached to the nasal bone is the nasal cartilage (cutaneous elasticity is lacking here due to the intimate adherence of the integument to the nasal cartilage)

13. The *anterior nares* is the name given to the paired lower end openings of the nose

    They are separated from each other by the nasal septum

14. The *mouth* (inferior to the anterior nares) is the upper opening of the alimentary canal

    The lips contain muscles and vessels and play an important role in facial expression

15. The *mental symphysis* of the mandible is the medial line of the lower third of the face (it is possible to palpate the entire mandible from mental symphysis to the condyle)
    a. the *inferior* border of the *mandible* passes posteriorward to the *angle* which is the most inferior part of the ramus
    b. anterior to the angle is a depression for the passage of the facial

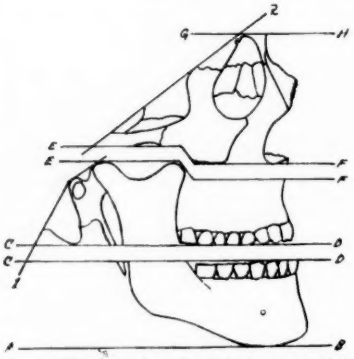

FIG. 4. The norma lateralis of the face as divided into lower third, middle third, and upper third. Each segment (or division) is presented separately and in relation to that planned associated region of study.

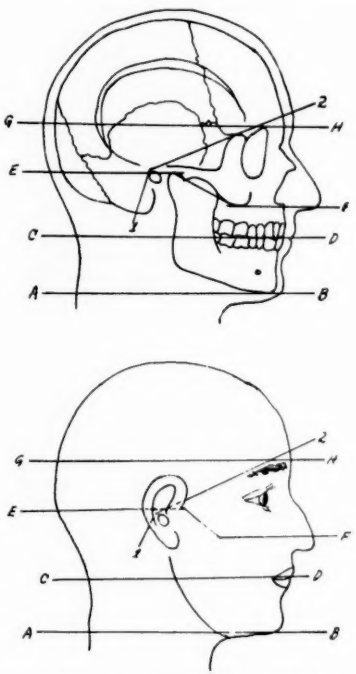

FIG. 5. The norma lateralis of the skull insitu (above) and the topographical norma lateralis (below) with the lines of division for face and cranium.

Interpretation of anatomical and/or surgical divisions of the face.

Boundaries (See Figs. 4, 5 and 6)

A-B— Boundary line between superior border of the neck and inferior border of the lower third of the face.

C-D—Boundary line between the superior border of the lower third of the face and the inferior border of the middle third of the face.

E-F— Boundary line between the superior border of the middle third of the face and inferior border of the upper third of the face.

G-H—Superior border of the upper third of the face.

1-2— Posterior boundary of the face.

artery, pulsations can be palpated

c. the *condyle* of the *ramus* is palpated anterior to the tragus of the external ear and inferior to the zygomatic arch

d. with the mouth of a living subject opened, the movement of the condyle in the *glenoid fossa* can be palpated during advancement upon the *articular eminence*

e. the anteriorward movement can be demonstrated as the forward movement of the condyle allows greater access to the external auditory meatus. Place the little finger in the external auditory canal and open and close the mouth

f. the *mental foramen* in the mandible allows for passage of the mental vessels and nerve

16. Arteries of the face
    a. the *temporal artery* (between the ear and the zygomatic process of the temporal)
    b. the *facial artery* on the body of mandible just in front of the masseter muscle, at the angle of the mouth, passes along the naso-labial fold and lateral aspect of the nose to the nasal canthus
    c. the *anterior temporal* and *facial arteries* are useful for palpation
    d. the *facial vein* traverses the face from the nasal canthus of the eye to the anterior angle of the masseter muscle

17. Expression is due to muscular traction upon facial integument

18. The external ear (or pinna) is the common point of junction of the neck, face, and cranium

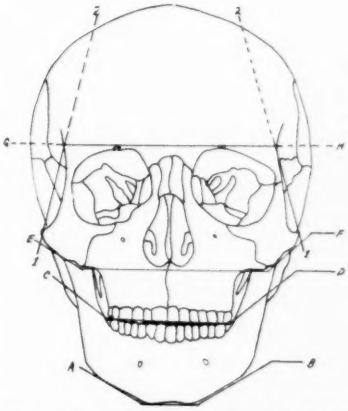

FIG. 6. The norma frontalis of the skull divided into face and cranium with related boundary lines.

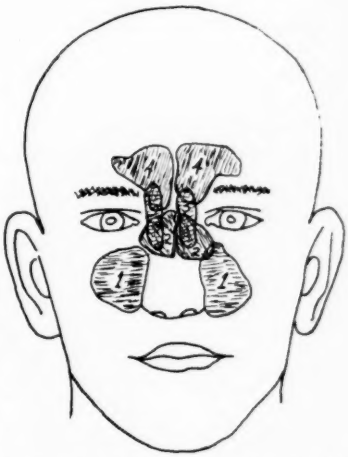

FIG. 7. The topographical norma frontalis with the projected outlines of the paranasal sinuses.

The Paranasal Sinuses
1. Maxillary sinus
2. Sphenoidal sinus
3. Ethmoidal cells
4. Frontal sinus

COLLEGE NEWS

Edited by SIDNEY EPSTEIN, D.D.S., *San Francisco*

University of Southern California:

ANNOUNCEMENT

Dr. Robert W. McNulty, formerly Dean of Loyola University College of Dental Surgery, became Dean of this school September 1st.

University of North Carolina:

FACULTY APPOINTMENTS

Claude R. Baker, Professor, Fixed and Partial Dentures.

R. E. Sturdevant, Professor, Operative Dentistry.

C. M. Sturdevant, Assistant Professor, Operative Dentistry.

Emory University:

FACULTY APPOINTMENTS

R. A. McEwen, Professor, Fixed Bridge Prosthesis.

Gene Nardin, Professor of Medicine.

Robert Corr, Instructor, Operative Dentistry.

E. N. Harris, Instructor, Operative Dentistry.

Charles Crook, Teaching Fellow, Orthodontics.

J. W. Glass, Part Time Instructor, Operative Dentistry.

FACULTY CHANGES

L. Berry Brown, Professor, Prosthetic Dentistry, to include Superintendent Clinics.

Anderson M. Scruggs, Professor, Technical Composition, to Professor of Dentistry.

George T. Lewis, Professor, Biochemistry, from School of Medicine.

Ernest L. Banks, Associate Professor, Periodontology.

C. W. Huff, Professor, Clinical Operative Dentistry, formerly Associate Professor.

Mrs. Emily Walker, Instructor in Anatomy, from School of Nursing.

J. Elliott Scarborough, Professor, Oncology.

Drs. R. L. Brown, R. W. Adams, R. L. Jones, W. D. Stone and J. C. Monaghan were made Assistant Professors in their various Departments.

Temple University:

ANNOUNCEMENTS

Dr. Gordon Winter has become Professor of Oral Diagnosis, transferring from the University of Pennsylvania.

A. J. McKechnie, Instructor, Crown and Bridge, and Secretary of the Faculty.

J. J. Riviello, Instructor, Pedodontia.

Milton Silver, Instructor, Periodontia.

H. J. Lantz, Instructor, Prosthetic Dentistry.

Leonard Zebrowski, Instructor, Operative Dentistry.

William Irwin, Instructor, Radiodontia.

Temple University is making 23 announcements of awards and prizes to graduating seniors.

University of Illinois:

FACULTY APPOINTMENT

Robert Black, Post Graduate Course, Airbrasive Instrument for Cavity Preparation.

ANNOUNCEMENT

A grant of $5,000 has been made to the University for cancer study under the direction of Dr. Isaac Schour.

University of Toronto:

DEATH

Announcement is made of the passing of Dr. Thomas Cowling, Professor of Dental Technology and Metallurgy and Assistant Dean.

Tufts College:

ANNOUNCEMENT

The Division of Graduate and Post-Graduate Students announces a schedule of 38 refresher courses throughout the academic year.

Ohio State University:

ANNOUNCEMENT

Announcement is made of 8 refresher courses to be given in the Fall of 1950.

University of Pennsylvania:

ANNOUNCEMENTS

Announcement is made of an extensive number of post-graduate courses for the year of 1950.

Dean Appleton, Member, Panel of Appraisers, to evaluate subjects for inclusion in The Handbook of Biological Data, American Institute of Biological Sciences.

Leroy Ennis, Consultant, Roentgenology, and Diagnosis, U. S. Public Health Service.

Loyola University (Chicago):

ANNOUNCEMENT

Dr. A. Raymond Baralt, Jr., of Philadelphia, becomes Dean of the School, succeeding the resignation of Dr. McNulty to become Dean at the University of Southern California.

"I wish the Bald Eagle had not been chosen as the Representative of our Country; he is a Bird of bad moral Character; like those among Men who live by Sharping and Robbing, he is generally poor and often very lousy.

The Turkey is a much more respectable Bird, and withal a true original Native of America."

BENJAMIN FRANKLIN, from a private letter through *The Pacific Spectator*, 4, 445; 1950.

THE LIBRARY CORNER

JOSEPHINE P. HUNT,[1] *Chicago*

The second issue of the new Index to Dental Literature, including January-June, 1950, has been sent to subscribers. The third issue covering January-September, inclusive, will be mailed in the month of November. This dental index now includes articles from 144 dental journals all in the English language. Comments on the Index are welcomed.

Through the joint efforts of the Council on International Relations and the Bureau of Library and Indexing Service, 129 sets of the bound volumes of the Index to Dental Literature have been sent to various foreign countries. Among the places which have received sets are Ireland, Israel, Italy, Norway, The Netherlands, Haiti, Hong Kong, etc. Each set includes fifteen bound volumes and weighs fifty pounds. The years 1876-1941, inclusive, are covered by each set. The only expense to the recipient is the cost of transportation which is not paid by the A.D.A. This expense has been taken care of, in some instances, by the recipient libraries or by the embassy of the country to which the indexes were going. In other cases the sets were sent through the Smithsonian Institution in Washintgon. If other dental libraries wish and have not yet requested sets of these Indexes, application may still be made either to Dr. Donald A. Washburn or to Dr. Stanley D. Tylman, Chairman of the Council on International Relations, whose address is 55 E. Washington Street, Chicago, Illinois. Transportation costs must be arranged for. Though this distribution was intended at first only for libraries which had been devastated by war, the plan has been extended to include any recognized dental or medical library and will be continued as long as the supply lasts. The two volumes covering the years 1942-1944 and 1945-1947, inclusive, may be obtained only through purchase.

The first issue of the new Current List of Medical Literature, published by the Army Medical Library, is now available and may be purchased from the Superintendent of Documents, Washington, D. C. This Current List indicates that articles from approximately 25 of the major dental journals in English and from about 30 dental journals in foreign languages will be indexed. Though the Current List covers only a fraction of the journals included in our own Index to Dental Literature, it probably contains a majority of the important articles and has the added advantage of including some journals in foreign languages. This first issue (July, 1950) actually indexes only eleven dental journals in English and two in other languages. The titles of the journals that are actually indexed are preceded by an asterisk. The names of some journals not preceded by an asterisk are followed by the name of a month but the significance of this is not immediately apparent.

This Current List of Medical Literature is somewhat less usable than the Index to Dental Literature, but the present arrangement of the List of Current Literature is certainly a great improvement over the previous arrangement. It is now divided into two parts. These are (1) a register of articles arranged according to journals and (2) an abridged subject and author index. From the subject and author index, the user of the Index is referred back by number to the entry under the name of the journal for complete information on each article.

An entertaining but thought provoking editorial entitled "Bother About Books" was published in the April 26, 1950, issue

[1]Associate Librarian, American Dental Association.

of The Medical Press. This editorial makes fun of some of the ridiculous customs requirements of various countries. A few of these customs requirements for books are given. The editorial states that "It is a prevalent practice in the Americas to tax books by weight. . . . The Canadian pays a sales tax of 8 per cent. As the tax is payable on entry, he has the added privilege of traveling to the nearest customs post office to pay it.

"Brazil mixes its tax by weight with a social levy on value, a postal levy and an ingenious system of Consular Invoices on substantial parcels. It is often cheaper to forget about the invoice and to pay the fine for the omission instead.

"France taxes cost of books plus postage and in some cases adds a transaction tax. In case these should not be enough, the bookseller pays a turnover tax and local tax, while leather-bound books are singled out for an import duty of 20 per cent.

"It is Cuba, however, that deserves the prize for complexity—books are first taxed by weight twice then surcharged on the sum of the two taxes, and finally subjected to a sales tax on the duty-paid value."

Perhaps these illustrations serve to show how needlessly complex and ridiculous some of the customs arrangements have become. These examples of the peculiarities of the customs regulations regarding books could undoubtedly be multiplied many times and it is encouraging that someone has again called it to the attention of those interested in the international sale and exchange of scientific publications. Perhaps steps have already been taken to improve this situation, as according to current information, books in English coming into the United States are now subject to a tax of five per cent of net invoice value. Books coming here in foreign languages are duty free. Books sent from the United States to some other countries may be duty free when mailed by book post.

The A.D.A. library has on hand an over supply of old catalogues of most of the dental schools in the United States. These catalogues will be sent, if available, to school libraries that wish them. There is no charge for these except transportation costs.

BOOK ANNOUNCEMENTS

Oral Histology and Embryology. This is the sixth edition of one by the same title by F. B. Noyes, D.D.S., Sc.D., edited now by Isaac Schour, D.D.S., Ph.D., Professor of Histology and Associate Dean, College of Dentistry, University of Illinois and Harold J. Noyes, D.D.S., M.D., Professor and Dean, University of Oregon, Dental School.

The book is comprised of 443 pages with 284 illustrations and 15 plates, including 11 in color. All the authors are well known in the profession hence the authoritativeness of this book is at once recognized. It is printed on good stock and is easily read. Published by Lea & Febiger. Price $7.50.

Textbook of Orthodontia, by Robert H. W. Strang, M.D., D.D.S. This is the third edition of this book by the author who is Director of Extension Courses in the Extension Teaching Department of Temple University, consisting of 825 pages with an index and 1050 illustrations with some in color.

It is well printed on a good quality of paper and set in type which is easily read. The text pages are a little larger than usual but this is probably done to keep the total pages down to some extent. Published by Lea & Febiger. Price $15.

Anatomy and Physiology (second edition), by Carl C. Francis, A.B., M.D., Assistant Professor of Anatomy, Western Reserve University, Cleveland, Ohio, and G. Clinton Knowlton, Ph.D., Assistant Professor of Physical Medicine, Emory University, Medical School. This is a book of 624 pages with an index, including 365 illustrations and 31 color p'ates. Price $6.25. Published by C. V. Mosby and Company.

Strong-Carter Dental Clinic Reports for the year ending August 31, 1949, published by Palama Settlement, 810 North Vineyard Street, Honolulu 17, Hawaii. This report covers the work done by this dental health progress, with which members of the profession are already quite familiar. The copy may be had for the asking.

Oral Hygiene and Preventive Dentistry, edited by Russell W. Bunting, D.D.Sc., Professor of Dentistry and Dean of the School of Dentistry, Michigan, and prepared by seven collaborators. This is a book of 240 pages with an index, including 134 illustrations and one color plate. It it written by men and women well known in the profession. Published by Lea and Febiger. Price $5.00.

Acrylic, Inlays, Crowns and Bridges, by Irwin Robert Levy, D.D.S., Assistant Dentist, Mt. Sinai Hospital, New York City. This is a book of 128 pages with an index and 151 illustrations. Published by Lea and Febiger. Price $3.75.

Bacterial Infection (fourth edition) (special reference to dental practice), by J. L. T. Appleton, B.S., D.D.S., Sc.D., professor of Bacteriopathology and Dean, The Thomas Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania. This book is thoroughly revised with 108 illustrations and five plates, four in color and an index. It consists of 644 pages, well printed. Published by Lea and Febiger. Price $10.

Oral and Facial Cancer, by Bernard G. Sarnat, M.D., F.A.C.S., Professor, Oral and Maxillofacial Surgery, College of Dentists, University of Illinois, and Isaac Schour, D.D.S., Sc.D., Professor of Histology and Associate Dean, Postgraduate Studies, University of Illinois.

This is a new book put out by these two

well known authors, especially the latter, within the dental field. It consists of 300 pages with an index, a list of references, appendix, a list of 76 questions for students, and is well illustrated including many color plates.

There is a foreword by Dr. Andrew C. Ivy, Vice-President in charge of the Chicago Professional Colleges of the University. It is published by the Year Book Publishers, Chicago, Illinois. Price $6.00.

The First Anesthetic, by Frank Kells Boland, M.D. The author is Professor of Clinical Surgery, Emory University School of Medicine, and President, Crawford W. Long Memorial Association.

This is a book of 160 pages with a bibliography, reference and an appendix. As is indicated in the title, this book represents an attempt to show conclusively the date and conditions of the first anesthetic administered. It is well illustrated, well arranged and should be in all of our libraries bearing upon the history of this important subject.

The book is published by the University of Georgia Press, Athens, Georgia. The price is $3.00.

Zoology—General Outline in Laboratory Procedure, by Potter. Published by C. V. Mosby Company, St. Louis, Missouri. Price $2.85.

Humanizing Our Great Profession, by Herbert Ely Williams, D.D.S. This is a nice little story of 287 pages of the life of a man well known, especially along the Atlantic Coast, and who has enjoyed his life and work. It may easily be considered a bit of philosophy.

The book is published by Dr. Williams and may be secured by addressing him at Red Bank, New Jersey.

An Introduction to College. This is the title of a book bound in heavy cardboard by Samuel Engle Burr, Jr., Litt. B.M.A., Ed.D., Chairman Department of Education, College of Arts and Sciences, the American University, Washington, D. C.

This book is printed in offset type largely in the form of short, concise statements and questions. It is divided into three units: The College and Community; What to Learn and How to Learn; and Developing a Philosophy of Life.

It should prove very valuable in the orientation of students new and old to environments in a changing order. Published by Burgess Publishing Company, Minneapolis 15, Minnesota. Price $2.50.

New Books. The Council on Dental Health of the American Dental Association announces the availability of three new booklets: S5 Your Teeth—How They Grow; P11 Orthodontics: Questions and Answers; G7 Your Guide to Dental Health.

Announcement is also made of a supplement to the 1950 Catalog of Dental Health Education Material, including new slides, new publications, material out of stock, and new prices.

Introduction into Dental Medicine, by Professor G. Axhausen, Munchen, Germany. This is a book of 243 pages, with 227 illustrations. It is well printed and on good stock. The author is said to have had a very broad experience and his book would indicate a mastery of his subject. The forepart of the book is devoted to a discussion of problems in treatment and prognosis while the latter part is more technical in nature.

Histology, Textbook of. This is the fourth edition of this book by E. V. Cowdry, Professor of Anatomy, School of Medicine, Washington University. It consists of 640 pages, with an index. It is thoroughly revised, printed on good paper and is well illustrated, some in color. Published by Lea & Febiger, Philadelphia 6. Price $8.50.

Principles of Orthodontics. This is the second edition of this book by

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Periodontia, Textbook of (Oral Medicine). This is the third edition of this book by Dr. Miller, as the editor and principal author. It includes 34 contributors. Dr. Samuel Charles Miller is Professor of Periodontia, New York University College of Dentistry.

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Edodontia. This book by Edgar D. Coolidge, B.S., M.S., D.D.S., LL.D. (Hon. Loyola), is another contribution by him and based on his previous book, "Clinical Pathology and Treatment of the Dental Pulp and Periodontal Tissues," but is not a revised edition. It is an entirely new book.

It consists of 300 pages, including an index, 355 illustrations and one colored plate. It is printed on good paper, easily read and shows a minuteness of detail in arrangement of material. The author is now Emeritus Professor, Therapeutics, Preventive Dentistry and Oral Hygiene, College of Dentistry, Loyola University, Chicago.

The book is published by Lea and Febiger, Washington Square, Philadelphia 6. Price $6.00.

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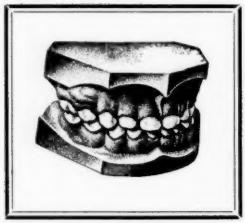

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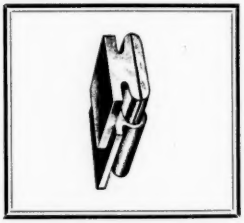

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